

# RESURRECTION OF A LITTLE-KNOWN SPECIES OF *OENOTHERA* SECT. *OENOTHERA* IN NORTHEASTERN MEXICO (TRIBE ONAGREAE: ONAGRACEAE)

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## ABSTRACT

*Oenothera pennellii* Munz (*Oenothera* sect. *Oenothera* subsect. *Nutantigemma*) was recently placed in synonymy with the widespread and variable *O. pubescens* Willd. ex Spreng. A series of recent collections from Coahuila, Nuevo León, Tamaulipas, and Zacatecas, México, show that *O. pennellii* is a distinctive, subcaulescent, apparently perennial species restricted to northeastern Mexico at relatively high elevations. It is largely allopatric from the widespread, caulescent, annual or biennial *O. pubescens*. Like *O. pubescens*, *O. pennellii* is a permanent translocation heterozygote species.

KEY WORDS: *Oenothera* sect. *Oenothera* subsect. *Nutantigemma*, evening-primrose, Mexico, Onagraceae

## RESUMEN

*Oenothera pennellii* Munz (perteneciente a *Oenothera* subsect. *Nutantigemma*) fue colocada recientemente en la sinonimia de *O. pubescens* Willd. ex Spreng., una especie muy variable y de amplia distribución. Las colecciones procedentes de Coahuila, Nuevo León, Tamaulipas, y Zacatecas en México, muestran que *O. pennellii* es una especie distinguible por su hábito sub-acaulescente y que aparentemente está restringida al noreste de México en elevaciones relativamente altas, donde es ampliamente alopatrica con *O. pubescens*, especie caulescente, anual y de amplia distribución.

*Oenothera pennellii* Munz was described in 1939 and was maintained in Munz's treatment of all North American Onagraceae (1965). Following detailed studies of subsect. *Raimannia*, Dietrich and Wagner (1988) placed *O. pennellii* in synonymy with the widespread and variable *O. pubescens* Willd. ex Spreng. They considered it a rare (five known collections) but noteworthy variant among several in *O. pubescens* (Dietrich & Wagner 1988: 77). Subsequent to that study, many new specimens have been collected in high-elevation areas (2,000–3,600 m) in the northeastern Mexican states of Coahuila, Nuevo León, Tamaulipas, and Zacatecas; most of these collections are deposited at TEX/LL. What previously seemed a sporadic variant now appears to represent a distinguishable species restricted to northeastern Mexico at relatively high elevations, and largely allopatric from *O. pubescens*, which ranges from Arizona and New Mexico to Guatemala, and in South America in the Andes of Colombia, Ecua-

dor, and Peru. The geographical ranges of the two species overlap only in Sierra del Carmen in Coahuila, but the single collection of *O. pubescens* from there was made several hundred meters lower than the lowest known populations of *O. pennellii*.

*Oenothera pennellii* characteristically has small flowers (petals 6–8 mm long) and is subacaulescent, with stems 0–2(–4) cm long. In contrast, *O. pubescens* usually has petals (6–)15–25(–35) mm long and is always caulescent with conspicuous stems up to 100 cm long, even in adverse moisture regimes. *Oenothera pubescens* never flowers from the basal rosette but has flowers formed in the leaf axils near the tips of the stems, as is typical in the genus. It is also annual or biennial, whereas *O. pennellii* appears to be a short-lived perennial from an enlarged taproot. On this basis I am here resurrecting this regional endemic to species status. Like *O. pubescens*, *O. pennellii* is a permanent translocation heterozygote (PTH) species. Pollen fertility is about 50% judging from several collections (McDonald 2064, Hinton 18858, 20452) examined. Permanent translocation heterozygosity has been very important in the evolution of the genus *Oenothera* and several other genera of the Onagraceae. The metacentric chromosomes with pycnotic, condensed proximal regions (Kurabayashi et al. 1962; Cleland 1972; Raven 1979) have been associated with the regular occurrence of rings of chromosomes, resulting from reciprocal translocations. The phenomenon of reciprocal translocations reaches an endpoint of development in the specialized system known as PTH. The best known species possessing this system are the members of *Oenothera* subsect. *Oenothera*, in which the structure and mechanisms were worked out (Cleland 1972; Harte 1994; Deitrich et al. 1997). In addition to the translocations, the system requires balanced lethals, which prevent the formation of the homozygous combinations (most easily observed as ca. 50% infertile pollen), self-pollination, and alternate disjunction of the chromosomes during meiosis.

***Oenothera pennellii*** Munz, Leaflet. W. Bot. 2:156, 157. 1939. (**Fig. 1**). TYPE: MEXICO. NUEVO LEON: Sierra Madre Oriental, Mt. "El Infiernillo," Pabillo, SE of Galeana, 2,750–2,900 m, 29 Jun 1934, F.W. Pennell 17139 (HOLOTYPE: US-01640419, ISOTYPE: PH not seen, POM).

Acaulescent or subacaulescent, short-lived perennial herb from fairly stout taproot; stems occasionally present, 1–4 cm long. Rosette and cauline leaves 2–6(–10) × 0.2–1.5 cm long, oblong-lanceolate, sinuate-pinnatifid to occasionally remotely serrate on smaller leaves, strigillose and hirtellous, especially on the veins. Flowers axillary, arising among the basal leaves or on the short stems. Floral tube 17–30 mm long, nodding prior to anthesis, reddish purple, sparsely hirtellous, the hairs appressed or spreading, and occasionally also strigillose. Sepals reflexed in pairs at anthesis, 5–6 mm long, oblong-lanceolate, pubescent, free tips ca. 0.2 mm long. Petals 6–8 mm long, about as broad, yellow, changing to reddish orange when wilted, slightly notched apically with short tooth in

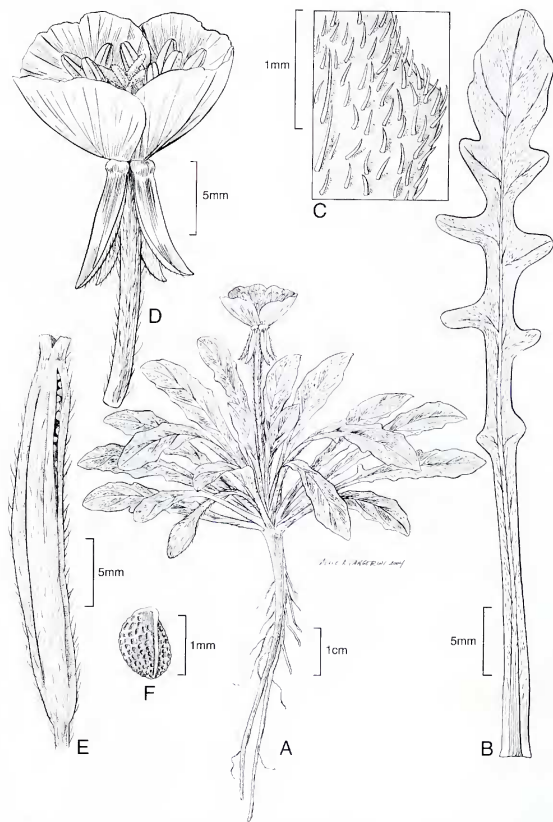


FIG. 1. *Oenothera pennellii*. **A.** Habit (Hinton et al. 20452 & Wendt & Adamcewicz 523C), unopened bud (Pennell 17139, holotype). **B.** Leaf (Pennell 17139, holotype). **C.** Inset showing pubescence (Hinton et al. 20452). **D.** Flower with part of floral tube, but not ovary (Hinton et al. 18858). **E.** Capsule (Pennell 17139, holotype). **F.** Seed (Pennell 17139, holotype).

notch. Staminal filaments 6–7 mm long, subequal; anthers 2–3.2 mm long; pollen ca. 50% fertile. Style 20–35 mm long; stigma surrounded by the shedding anthers at anthesis, the lobes ca. 1.5 mm long. Capsules 16–28 mm long, cylindrical, thin-walled, sessile, hirtellous and strigillose, ca. 3 mm in diameter. Seeds 1–1.2 mm long, light brown, globose-obovoid, with median ridge and shallowly regularly pitted surface.

**Distribution.**—*Oenothera pennellii* occurs in open areas in mixed conifer (*Pinus*, *Pseudotsuga*, *Abies*) and *Quercus* forests and in subalpine *Pinus* forest, Coahuila, Nuevo León, Tamaulipas, and Zacatecas, Mexico, from 2,000 to 3,600 m. Flowering from May through September.

Specimens Examined: **MEXICO. Coahuila:** Madera del Carmen, upper end of Dos Canyon, at road fork to Campo Uno, 23 Jun 1976, *Fryxell* 2715 (LL, NY); Sierra Madera del Carmen, at Campo El Tres, an abandoned logging camp in the high country, [29°00' N, 102°36' W], 7 Aug 1974, *Wendt & Adamcewicz* 523C (TEX); Ocampo, along old logging road, of mill at Campo 4 adjacent to sawdust pile, [28°59' N, 102°33' W], 28 May 1975, *Riskind & Patterson* 1826 (LL); Sierra de Parras, *Purpus* 4624 (UC); Arteaga, Sierra Zapaliname, 27 Jun 1990, *Hinton et al.* 20452 (TEX); Sierra del Coahuila, 2 Jun 1985 *Hinton et al.* 18858 (TEX); Sierra del Arteaga, Canon de la Carbonera, Las Vigas, [25°20' N, 100°39' W], s.d., *Villarreal & Carranza* 3776 (TEX). **Nuevo León:** Picacho de San Onofre, ladera este, 5 Jul 1985, *McDonald* 1662 (TEX). **Tamaulipas:** filo y lado este de Peña Nevada, 5 Jul 1985, *McDonald* 1630 (TEX); Miquihuana, Sierra de Peña Nevada, ceja y ladera S y SO [23° 35' N, 99° 46' W], 3600 m, 22 Aug 1986, *McDonald* 2064 (MO, TEX [2]). **Zacatecas:** Sierra Madre Oriental, Mt. "El Temoroso," N of Aranzazu, 17 Jul 1934, *Pennell* 17466 (US).

The five collections cited by Dietrich and Wagner (1988) as the low-growing phenotype are a mix of short-stemmed *Oenothera pubescens* and *O. pennellii*. Three of the collections represent *O. pennellii* and are cited above. The collection from Sierra del Carmen, Coahuila (*Henrickson* 11643 [MO]), is *O. pubescens* but was collected in a heavily grazed area and thus had very short stems. Cultivated material of this collection at MO has stems up to 30 cm long and is atypical of *O. pubescens* only in having flowers much smaller than usual (petals ca. 6 mm). Another collection (*Moore* 3157 from Hidalgo, MO) also is *O. pubescens* and occurs well outside the range of *O. pennellii*.

The substrate for *Oenothera pennellii* is largely unknown. *Wendt & Adamcewicz* 523C give the substrate as rhyolite, and *Pennell* 17466 gives it as gravelly andesite, both volcanics. With the information available it is not possible to ascertain if *O. pennellii* is restricted to volcanic substrates; however, Guy Nesom (pers. comm.) indicates that the type locality is gypseous. Since limestone is very common throughout this region it should be looked for on this substrate as well.

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